analogous in character to those which appear in the north-west portion of the Glarus-Prättigau crust-basin.

The Falknis block is an anticlinal block separated by curved strike-faults from the Rhätikon on the north and he Prättigau on the south, and cut by north-south faults. It shows, therefore, the general east-west strike and transverse fractures characteristic of the eastern Alps. The curvature of the strike in the west part of the Falknis Chain from east-west to north-west may, like the curvature of the fault at this part, be taken to signify a resultant or compensatory divergence due to the intercrossing of the local and the east-Alpine strike. Similarly, at the east end of the Falknis, the east-west strike curves to the south-east. The Falknis fault-block is a replica of the Gröden Pass anticlinal fault-block. The east-west strike is the dominant strike of the Eastern Alps, trending to E.S.E. in South Tyrol. It is acknowledged to have been an ancient strike along which movements have recurred in various ages in the Eastern Alps, although during the Pliocene movement the horizontal compressions from north and south were much less intense in the eastern than in the western Alps. This fact expresses the chief difference which obtains between the structures on the east and the west of the Rhine Valley. The fold-arcs round the east of the Glarus-Prättigau crust-basin have not sustained the same degree of compression during the subsequent Alpine folding as those round the western periphery; neither have the horizontal pressures acted quite from the same directions, the Alpine pressures having acted across Glarus towards the N.W., and across the Prättigau and Rhätikon more towards the north.

The eastern thrust from the Silvretta Massive gives expression both to the horizontal compressions rectangular to the eastern fold-arc of the local crust basin, and to the horizontal strains acting along the strike of the Alpine curve. In the greater Alpine curve, just as in the case of the smaller curve of the local basin, the formation of radial uplifts and downthrows is determined by these tangential pressures. And it is this cross-system which is more particularly accountable for the diagonal N.N.W. and N.N.E. and transverse faults and thrust-fractures in the Alps.

In my interpretation the Lenzerhorn Chain represents fold-arcs on the south-east of the local basin. The curved strike veers here from north-east to west, and there are also fault-radii in N.N.W. direction. The oblique shearing that has occurred here is apparently stronger than in the Rhätikon, but not nearly so strong as in the Brigels and Vorderrhein Chain, which represents the southern fold-arc in the Glarus district. My inference is that the original Glarus-Prättigau crust-basin with its peripheral folds has been cut into two unequal halves by the development of the Rhine fracture during the later Alpine movements. The Rhätikon and the Glarus have been rent asunder at the north of a radial Alpine fracture. The regional Alpine movements have superinduced wider curves above the local curves and have affected the two halves of the basin with different degrees of intensity, so that the eastern half occupies a broader area from north to south than the more strongly crumpled western half.

Hence the ground-work of the structure in this region is based upon *intersecting fold-arcs*, and all the additional details supplied by Prof. Rothpletz can be adopted in the scheme of Alpine geology which I demonstrated in 1899 upon the basis of the "fold-arc" and the "unit-area of depression" surrounded by torsion-curves of strike (Report Intern. Geogr. Congr. Berlin, 1899). The science of geology finds itself, at the threshhold of this new century, entering upon a development of research in which advance can only be made if the student of earth-structures can bring to bear upon his observations a sound knowledge of the laws of higher mathematics, dynamics and physics. And, if I may make a forecast, it is that structural geology will be ere long grouped in our university curricula with these exact branches of science.

MARIA M. OGILVIE-GORDON.

THE ZOOLOGICAL RECORD FOR 1899.

The Zoological Record. Vol. xxxvi. Being Records of Zoological Literature Relating Chiefly to the year 1899. Edited by D. Sharp. (London: Gurney and Jackson, 1900.) Printed for the Zoological Society.

THE editor of this invaluable record is to be congratulated on its early issue, the present volume having been in the hands of the public during the first week in December. The amount of energy on his part necessary, in order to secure punctuality in the delivery of their quota of manuscript from twelve contributors, can scarcely be realised except by those who have undergone a similar experience. This early appearance of the volume is, however, in part due to the circumstance that the contributors are now instructed not to await the arrival of the whole of the year's literature, but to be content with as much as is to hand at the date when their manuscript is required. That this decision is a wise one there can be no doubt, for it is much more important to issue the record at as early a date as practicable, than it is to insist on its containing the whole available literature of the year to which it is specially devoted.

This leads naturally to the remark that some want of uniformity is noticeable with regard to the inclusion of portions of certain serials in each year's record. For instance, the fourth part of the volume of the *Proceedings* of the Zoological Society of London for each year is not issued till well on in the following year. Now we find that in the records of mammals and birds, the contents of this part are quoted in the year to which they nominally belong, while they are omitted in the reptile and fish records. It is not for us to discuss which plan is the better, but we do urge that strict uniformity in this respect should be insisted upon by the editor.

Nor is this the only instance in which that functionary does not appear to have his team sufficiently well in hand. As the record of insects is by the editor himself, we may take this as the model which ought to be strictly followed by all his subordinates. This record is preceded by a carefully written introduction, bringing into special notice the leading features in the year's work; the papers are numbered, and where a series of new species are described in any particular genus, they are collectively designated as such at the end of the paragraph. In the

main, this admirable model is copied in the mammal record; but in the bird section the introductory notice is confined to five lines, and the number of unnecessary repetitions of "n. sp." (as on page 38) wastes much valuable space. In the reptile and fish records no introduction at all is given, and the papers are not numbered. Introductions are likewise wanting to the Bryozoa and Cœlenterata records. On the other hand, in the Tunicate record the notices of work accomplished are, compared with other sections, disproportionately long and too verbose.

Again, there are many minute details where more supervision on the part of the editor might, we think, have been devisable. For example, some recorders use "P. Z. S.," and others "P. Zool. Soc., London," for a familiar zoological journal. In the case of another journal we find it abbreviated to "P. New England Zool. Club" in the editorial list at the commencement of the volume; but in the mammal record (p. 4) it is quoted as "P. New England Club"; and in the bird record (p. 39) as "New England Zool. Club." Again, on p. 4 of the reptile record we find the abbreviation "Bull. Philad. Mus.," for which there is no corresponding entry in the serial list.

As an example of another type of what we venture to call lack of smartness, it may be noticed that on p. 38 of the bird record the entry relating to temperature should have come under the heading of Ratitæ instead of under one of the subdivisions of the same; and a similar remark applies to the second entry under the heading Accipitriformes, on p. 47. Again, on p. 39 of the same record, we fail to see why initials are prefixed to some authors' names and not to others; and why a well-known ornithologist is alluded to in one line as W. R. Ogilvie Grant and a few lines later on simply as Grant. In our opinion, such initials, except when there are two authors of the same name, should always be omitted, whereby much space would be saved. But here, as elsewhere, we crave above all things for rigid uniformity, which, in our opinion, should be made a *sine quâ non* by the editor.

We should also think it an advantage if it were definitely decided whether reviews of papers are to be included in the record. Such reviews are quoted in the Echinoderm record, but are omitted in the majority of the others. And here we may take the opportunity of inquiring why the names of authors in the Echinoderm record are printed in much larger type than in the other sections of the volume. Much valuable space is also wasted in this record by the very unnecessary multiplication of paragraphs. Catalogue numbers are also added to the papers, which is not done elsewhere.

Turning from the unpleasant task of fault-finding to the more congenial duty of commendation, it may be said that, apart from trivial errors and what we regard as imperfections, the work on the whole has been carried out in a most excellent manner alike by the editor and his contributors. With the aid of the admirable subject-index which has been introduced of late years by Dr. Sharp in each record it is now practicable for a worker in any special branch of morphology—say histology of the eye—to find out what has been done in that particular subject in each group of the animal kingdom. The record of new species and sub-species seems to be as well kept as in previous years, and at present shows no signs of diminution in length. Of course there are some omissions which ought not to have occurred—notably one of a so-called new species of reindeer by the mammalian recorder; but these, it is to be hoped, will be filled up in the next year's issue.

And here it may be remarked that it is a great pity that certain scientific bodies are so dilatory in despatching their publications. For instance, the library of the Natural History Branch of the British Museum, on which so many of the contributors to the *Record* depend for their material, only received in November last certain parts of the *Bulletin* of the Paris Museum which were issued in 1899. Consequently the names of several species of mammals published during the year do not appear in the present volume, and similar omissions not improbably occur in other groups.

A feature of Dr. Sharp's insect record is the inclusion of an obituary list. There is no doubt that such a list is frequently very useful, but if a separate one were made for each division of the record a very unnecessary repetition of names would occur, and there would be some names whose position it would be difficult to allocate. A preferable plan, we think, would be to give a general obituary list, indicating the special subject or subjects connected with each name by appropriate letters.

We believe ourselves justified in saying that the Council of the Zoological Society have resolved to continue the issue of the *Record* for at least another year; and although to some it may appear an unnecessary expenditure of time and money to do work twice over, the convenience of having a special record of zoological work is so great that the apparent waste of energy may be justified.

As one who has worked for some years under Dr. Sharp's supervision, the writer of this review may take the opportunity of acknowledging the extreme lightness of the pressure of the editorial yoke, and the courtesy with which his own suggestions or objections have always been received. R. L.

OUR BOOK SHELF.

Practical Lessons in Metal Turning. By Percival Marshall. Pp. 166. (London: Dawbarn and Ward, Ltd., no date). Price 2s. net.

OF all the different trades included in the term "mechanical engineering," that of the turner is probably as interesting as any, and seems to appeal to the amateur mechanic rather more than the others, for, given an efficient foot lathe, the work done is of general interest.

The book under notice will be found to contain information of much value to the happy possessor of a lathe, more particularly to the apprentice or amateur in the early stages of learning his trade; and in dealing with his subject the author prefers to devote the space at his disposal to a description of how a lathe is worked, rather than to how it is made.

The various processes are clearly dealt with in nine chapters, commencing with the important question of cutting tools with their proper angles for clearance, cutting and top-rake when working various materials We note, however, that the question of cutting speeds appears to have been overlooked, and this is unfortunate because it leaves the apprentice or amateur very much in the dark at the very beginning. Further on, measuring appliances are dealt with. More should have been made of micrometer callipers, so largely used in the States. These are not even illustrated.